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ABSTRACT

The primary objectives of this project commonly refereed to as "Assessing Human Abilities" were: (1) to provide reference measures for cognitive factors; and (2) to provide a guide to reference measures for self-report temperament factors. The overall objective was to conduct research in the area of factor analysis directed toward the identification of tests and other instruments that can serve as markers for well-established factors. The term "factor referenced" was introduced in this project to call attention to the factors as the construct of interest. This usage is in keeping with the general concept of criterion-referenced tests. It is the sense of clarifying something that is being measured that the factor-referenced measures are offered to researchers and practitioners concerned with assessing human abilities. It is hoped that the results of this study will aid in the development of structure for the cognitive domain of human abilities and a beginning for a comparable structure for the temperament domain of personality. Such theoretical structures are founded on empirical evidence and are amenable to continued challenge and verification. Researchers could be expected to use a small number of the resulting factor-referenced tests as markers for testing conjectures about factors in their studies. Summary lists of the 23 cognitive factors with the recommended marker tests, and the 28 temperament factors with the scales proposed for them are given in the appendix. (RC)

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PR-75-20

FINAL REPORT

OF

RESEARCH ON ASSESSING HUMAN ABILITIES

by

Harry H. Harman, Principal Investigator

July 1975

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This final report summarizes the research accomplished under Contract N00014-71-C-0117 from November 1, 1970 to March 31, 1975. Major tasks performed during this period are summarized and technical reports resulting from this research project are presented. A list of advisory panel members and project staff is given.		

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PREFACE

Psychologists and educators have long sought to identify dimensions of aptitude and ability, and have also been concerned with similar questions in the personality domain. Conceptually, the investigator would like to think of all possible tests that currently exist or might be constructed in the future, say in the cognitive area, so that a factor analysis would yield the "factors of the mind." Then the tests that best measured these factors would be designated as the reference tests for the factors. This type of abstraction is the behavioral scientist's counterpart of the chemist's periodic table, or the physicist's "standard meter."

An alternative approach to the identification of the factors of human ability is through the synthesis of the myriad research efforts of many individuals over time. This consists of a continuing process including: meticulous search and refinement of measures of abilities; review and attempts at matching and consolidating them into meaningful categories; empirical checks of results; and iteration of this process for clarification and improvement. It was in the spirit of contributing to this approach that the present project was undertaken. Hopefully, this study will be of help, at least in some small way, to the many workers striving to develop a conceptual framework for assessing human ability and temperament.

Our study, aimed at identifying tests and other instruments to serve as markers for factors of human abilities, has been sponsored by the Office of Naval Research, Psychological Sciences Division, Personnel Training Research Programs. This support is gratefully acknowledged. In particular, we wish to express our appreciation to Marshall J. Farr, Director, and Joseph Young of the Personnel Training Research Programs for their assistance in facilitating the research effort (as well as Victor Fields, who served in

this capacity during the first year of the project). We are also grateful to the Navy Personnel and Training Research Laboratory, San Diego, for enabling us to do the field experimentation. Bernard Rimland, Department Director, Edmund D. Thomas, and James Stapleton were most helpful, not only in expediting the test administrations but also by making contributions to the substantive aspects of the study.

The following panel of advisors was constituted early in the project:

Peter M. Bentler
University of California, Los Angeles

Raymond B. Cattell
University of Illinois

Lewis R. Goldberg
University of Oregon

J. P. Guilford
University of Southern California

Chester W. Harris
University of California, Santa Barbara

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John R. Nesselroade
The Pennsylvania State University

Warren T. Norman
University of Michigan

Bernard Rimland
Naval Personnel and Training Research Laboratory

Saul B. Sells
Texas Christian University

Calvin W. Taylor
University of Utah

Ledyard R Tucker
University of Illinois

Jerry S. Wiggins
University of Illinois

As a group, they had considerable influence on the direction of the project and we are grateful for their guidance. Furthermore, the project staff benefited greatly from the advice and counsel offered by individual members in the final stages of the project.

Other advisors whose help we acknowledge are the following members of the ETS staff:

John B. Carroll (now, University of North Carolina at Chapel Hill)

Norman Frederiksen

Harold Gulliksen

Richard Levine (deceased)

Frederic M. Lord

Samuel Messick

Lawrence J. Stricker

The project staff received assistance in a variety of areas from visitors and regular staff at ETS, the most important of whom were:

Edgar Howarth, University of Alberta, for review of noncognitive factor descriptions from draft copy of Guide, while spending part of his sabbatical leave at ETS (1975).

Joseph R. Royce, University of Alberta, for stimulating discussions on the psychological insights offered by the factor approach to the development of substantive psychological theory, during his visit at ETS (1973).

W. C. E. Young, University of Nairobi, for review of personality items when he spent part of his sabbatical leave at ETS (1972).

John L. Barone, overall guidance in computer programming.

John J. Ferris, experimental design.

Henrietta L. Gallagher, directing scoring of divergent production tests.

Irene Kostin, initial literature search in the temperament area.

Gita Wilder, writing many of the personality items.

Brenda J. Brown, Katherine Farley, Sharron Fouratt, and C. Brooke Gruenberg, typing assistance for all phases of the study.

To all of these people, our sincere thanks.

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FINAL REPORT

OF

RESEARCH ON ASSESSING HUMAN ABILITIES

Overview

This is the final report on a research study sponsored by the Office of Naval Research under Contract N00014-71-C-0117, NR 150 329. Although the project acquired the short title, "Assessing Human Abilities," its focus was explicitly on two areas: (1) to provide reference measures for cognitive factors; and (2) to provide a guide to reference measures for self-report temperament factors. The overall objective of the project has been to conduct research in the area of factor analysis directed toward the identification of tests and other instruments that can serve as markers for well-established factors. The total effort of the four-year project may be viewed, in retrospect, as consisting of three phases: Planning (approximately one year), executing plans (roughly, middle two years), and developing final products (last year, plus some slippage).

During the planning phase, consideration was given to problems of updating the marker tests for cognitive factors and what directions and means might be followed for developing marker measures for the personality domain. An important part in our planning was the convening of a Conference on March 29-30, 1971, for the purpose of getting a current reading of the status of reference measures for cognitive and noncognitive factors. The advisory group of specialists in the area of factor analysis and human assessment was chosen to represent the professionals who would be most likely to use such reference measures in the future. The Conference was designed to give an opportunity for the advisors to help us develop plans that would

assure the maximum utility of the resulting reference measures to the profession. It was also our hope that the participants themselves would gain something from one another. Those attending the Conference included the panel of 16 advisors, seven ETS advisors, and a representative of the Office of Naval Research, as well as members of the project staff.

Some general guidelines that emerged from this Conference were the following:

(1) A factor will be considered as "established" and markers for it will be provided as end products of this project if it is possible to identify it in at least three analyses performed in at least two different laboratories.

(2) At least three tests will be provided as markers for each established cognitive factor; at least four measures will be provided as markers for an established noncognitive factor, two for each of the opposite poles.

(3) Newly developed tests and other measures for both the cognitive and noncognitive domains will be field tested in order to determine some of their basic statistical properties (e.g., reliabilities and item difficulties) and to check their factorial content.

Thus, the objectives set for this study included updated reference tests for cognitive factors and at least a beginning of reference measures for noncognitive factors.

Toward the end of the first year of the study, and for the next two years, our endeavors followed two principal lines: 1) a thorough search of the literature for established factors; and 2) verification through field testing, including the development of new measures as necessary.

The final phase of the project involved the consolidation of the empirical results with the more general professional findings to provide reference measures for cognitive and noncognitive factors. The end products are a revised Kit of factor-referenced tests for cognitive factors and a Guide to factor-referenced scales for temperament factors.

In this project we introduced the term "factor-referenced" measure to call attention to the factor as the construct of interest. This usage is in keeping with the general concept of criterion-referenced tests. In a philosophical paper on questions of meaning of psychological measurement, Messick[1] considers the topic, "referencing measures to interpretation and use," in which he clarifies the oft-found fuzziness in the use of norm-referenced and criterion-referenced measurements. He calls attention to the wide acceptance of construct validity as "the touchstone of interpretation and meaning in psychological measurement," and stresses that " . . . all measurement should be construct-referenced. A measure estimates how much of something an individual displays or possesses. The basic question is, 'What is the nature of that something?' It may be answered by referring to evidence in support of particular attributes, processes, or traits construed to underlie and determine task performance."

It is in this sense -- of clarifying that something that is being measured — that the factor-referenced measures are offered to researchers and practitioners concerned with assessing human abilities.

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[1] Messick, S. The standard problem: Meaning and values in measurement and evaluation. Research Bulletin 74-44. Princeton, N. J.: Educational Testing Service, 1974. (Will appear soon in The American Psychologist.)

Research Accomplished

The aim of this study was to provide a reference basis for different researchers in their combined efforts to conceptualize and develop a theory and structure of human abilities. It is our hope that the results of this research will aid in the development of a structure for the cognitive domain of human abilities and a beginning for a comparable structure for the temperament domain of personality. Such theoretical structures are founded on empirical evidence and are amenable to continued challenge and verification. Researchers could be expected to use a small number of the resulting factor-referenced tests as markers for testing conjectures about factors in their studies.

A natural approach for the development of such a basis is to build upon the collective prior efforts. Of course, the 1963 revised Kit of reference tests for cognitive factors gave us a point of departure. The factor analysis conference held in the Spring of 1971 served to provide the current "state of the art" with respect to factor-analytically-derived measures of cognitive and noncognitive traits. More concretely, the extent of empirical evidence for well-established factors could only be determined by means of a thorough literature search. For factors so determined there arose the creative task of preparing suitable items as markers for them. Then, when a sufficient number of items had been prepared, they were "packaged" into tests or scales for field administration. Such pretesting or field tryouts served to determine test reliability, some normative information, and some verification of the effectiveness of the marker tests in identifying the postulated factors. The foregoing approach has led to a much improved reference Kit for cognitive factors and to a good start for a reference Guide for noncognitive factors, self-report temperament measures in particular.

The literature search indicated the present status of the 24 cognitive factors listed in the 1963 Kit and some half-dozen potentially new factors that have appeared since then. In the noncognitive area, a total of 28 factors in the temperament domain were identified through the literature search. These findings are summarized in the following reports:

TR 1. Toward the establishment of noncognitive factors through literature search and interpretation (John W. French).

TR 2. Cognitive factors: Some recent literature (Ruth B. Ekstrom).

The work of updating, modifying, and extending the 1963 Kit of cognitive tests involved the following three activities:

(1) Development of new divergent production tasks;

(2) Review and modification of other tests of the 1963 Kit to be included in the new Kit;

(3) Development of new marker tests for factors that have been established in the literature since 1963.

After the modification and development of the new tests, the empirical verification of their usefulness in marking the putative factors was carried out by means of two field experiments.

The first field tryouts covered 23 tests designed as markers for seven hypothesized cognitive factors related to divergent production. Since it was not feasible to give the total battery of tests to all subjects, our experimental design was such that no man had to take more than seven of these tests, while still providing sufficiently large N's (average 187) for

calculation of reliabilities and some factor analyses of subsets of tests. Ten different subsets were constituted in order to investigate the identifiability and degree of independence of the following factors: (1) associational fluency, (2) expressional fluency, (3) originality, (4) semantic redefinition, (5) sensitivity to problems, (6) figural flexibility, and (7) semantic flexibility. The results are presented in the following report.

TR 5. Problems of replication of seven divergent production factors (Ruth B. Ekstrom, John W. French, and Harry H. Harman).

In subsequent field work we improved our experimental design, employing matrix sampling, to enable us to calculate correlations among all variables and thus do factor analyses involving all of them. Such a design was used in another field tryout of 33 cognitive tests for 11 different factors. The aim of this part of the study was to investigate the five newly established factors from the literature, namely, concept attainment, figural fluency, integrative processes, visual memory, and verbal closure. Because it seemed especially important to determine whether the new factors could be separated from other somewhat similar factors, marker tests for six of these older factors were included in the study. These factors are figural adaptive flexibility, logical reasoning, general reasoning, number, spatial orientation, and speed of closure.

The new design involved the adaptation of a 21 x 29 formal statistical experimental design. The tests for the 11 putative factors were grouped into 21 "elements" in an attempt to reduce the variance in testing time of the 29 sessions. Each of these "elements" (consisting of one, two, or three tests) was administered in six different testing sessions. That is how

large N's were obtained for overall item and test statistics. However, for a correlation between two sets, the N was limited to the individuals taking the pair of tests in a given session. Further details of this design are included in the following report on the new cognitive factors:

TR 8. An attempt to confirm five recently identified cognitive factors (Ruth B. Ekstrom, John W. French, and Harry H. Harman).

An additional investigation of cognitive abilities is covered in the following theoretical paper:

TR 4. Psychometric tests as cognitive tasks: A new "structure of intellect" (John B. Carroll).

From a detailed subjective analysis of the cognitive processes involved in the tests of the 1963 Kit, the conclusion is drawn that cognitive tasks are complex, and cognitive factors resist classification by any rigid taxonomy such as Guilford's Structure of Intellect model; there are probably no such things as truly "pure" factors. Thus, a study of individual differences in abilities can profit greatly if it is closely tied to the experimental analysis of particular cognitive tasks.

Research in the noncognitive area proceeded in parallel with that in the cognitive area, although we had a head start in the latter. In the noncognitive area it was possible to complete the literature search prior to any field testing. Some of this work had already been done at ETS prior to the start of the project in conjunction with other research interests. Pertinent data were recorded for all studies in which a temperament factor was found. When a factor was found in three or more studies emanating from at least two different laboratories, it was retained as an "established"

factor. This required, as noted in Technical Report No. 1, a great deal of subjective judgment regarding corresponding factors, for it was rare for different investigators to do analyses involving common sets of variables. A total of 28 such factors have been identified.

For each of the noncognitive factors, we tried to include as markers the different concepts, or subscales, associated with them in the literature. Items were written for each subscale taking into account the following needs: (a) balancing the well-known differences in tending to acquiesce to a self-report questionnaire item, and (b) considering both of the opposite psychological poles that seem to be part of most temperament traits. A scheme that we followed for meeting these requirements involves four items for each concept so that a person "high" on a factor (i.e., direction in which the factor is named) would be expected to respond as follows:

(1) "yes" on an item designed to be positive on the positive pole of the factor;

(2) "no" on an item designed to be negative on the positive pole;

(3) "no" on an item designed to be positive on the negative pole;

(4) "yes" to an item designed to be negative on the negative pole.

Another way of stating this is by way of keying four such items intended as measures of a factor, namely:

	Key			
	Yes	No	Statement	Pole
(1)	1	0	Positive	Positive
(2)	0	1	Negative	Positive
(3)	0	1	Positive	Negative
(4)	1	0	Negative	Negative

This plan led to four sets of such four items each, prepared by three independent workers to avoid bias and in order to increase the reliability of measuring each factor. Furthermore, since each factor is exemplified by several different concepts, with an average of about three subscales per factor, the aggregate number of items to cover the 28 factors came close to 1400.

After all these items were developed it was necessary to put them in some reasonable and practical form for field tryout. What constitutes a noncognitive instrument is not as easily formulated as what constitutes a cognitive test. In the case of an ability test, a common procedure is to select items that presumably measure the desired ability and arrange them in order of difficulty, including an appropriate number to keep the most able of the intended population occupied for the planned time period of the test. For noncognitive measures it would not do to present, in sequence, all items intended to measure a particular trait. The several versions of a particular item must be spread throughout the instrument or else the examinee could infer the trait sought and respond as he wished to be perceived rather than as he is. The items intended to mark given factors and subfactors were appropriately coded so that they could be identified, sorted, and scored according to a predetermined key.

For a field test of the 28 factor-referenced scales, the items were put in 30 booklets (with repetitions) so that they could be administered in as many sessions to more than 4000 men at the Naval Training Center, San Diego. By means of a rather complex design, it was possible to limit the testing time for any individual to no more than 320 items, while still enabling the determination of relationships among all 87 subscales designed

to mark the 28 factors. A report, entitled "Experimental design for a study of self-report personality items," was presented by Harry H. Harman at a meeting of the Society of Multivariate Experimental Psychology in November 1972, at Fort Worth, Texas. As a result of this report, Dr. Lewis R. Goldberg volunteered to administer the full set of 1400 items to a sample of female and male students at the University of Oregon.

The first results stemming from the field tests in San Diego were reported at a symposium presented before the American Psychological Association in August 1973, in Montreal, Canada. It was our work in the personality area that served as a point of departure for planning the symposium which has since been published in the following technical report:

TR 3. Proceedings: Toward the development of more comprehensive sets of personality measures (Harry H. Harman, Editor).

The final results, covering the college sample as well as the Navy sample, are presented in the following reports:

TR 6. Verification of self-report temperament factors (Diran Dermen, John W. French, and Harry H. Harman).

TR 7. Seeking markers for temperament factors among positive and negative poles of temperament scales (John W. French and Diran Dermen).

Before the last report was published the material was presented by John W. French at a meeting of the Society of Multivariate Experimental Psychology in November 1974, at London, Canada, and the results of the discussion were incorporated in the report.

Final Products

In this research study the output includes not only the eight technical reports covered in the last section, but also several end products. These include the actual Kit of factor-referenced cognitive tests, a Manual for the use of these tests, and a Guide to factor-referenced temperament scales.

While the stated objective of the study was to develop two kits of tests -- one for the established cognitive factors and another for noncognitive factors -- the solution was not as simple as that. The Kit of reference tests for cognitive factors involved, in large measure, the revision and updating of material that had been under development for more than 20 years, with the last published version in 1963. Of course, there had to be introduced some new "established" factors, and tests to measure them had to be developed. Hence, the new publication is very similar in form to the preceding one but has been improved to provide more ready accessibility as well as the inclusion of the latest factors found in the literature and substantiated in field tests.

Since the development of reference materials for the noncognitive domain was a new endeavor for ETS, it entailed many special problems. First, the area of concern had to be delimited. The personality measures under consideration are limited to the area of temperament for normal adults. More specific limitations are spelled out in TR 1. After defining the area of concern, there still remains the question of how to provide reference materials for such factors. There is no ready counterpart to cognitive reference tests that can be easily reproduced for research purposes. Even ready-made personality scales usually cannot be used directly but must be interspersed with other scales. More importantly, it would have been very presumptous of us to assume that we could produce independent scales for all the personality

factors indicated in the literature. Therefore, in this first issue of personality referenced materials, our thesis has been to take those factors that have been "established" according to our criteria and to refer to existing scales, indicating the extent to which our empirical efforts support the particular factor. Where we had substantial success, we include our new scales. Thus, for 26 of the 28 noncognitive factors, references are given to scales developed by other researchers and scales developed in the present research if they held up in the experimental studies.

It is of interest to note the progress made over the last 20 or more years. The first Kit (1953) of reference tests for the better established cognitive factors included 16 factors with only specimen reference tests for each of them. None of these tests was developed at ETS. In subsequent years a number of additional factors and tests were considered, and some new tests were developed at ETS. The present Kit presents 74 factor-referenced tests for 23 cognitive factors that have been "established" in the literature and, at least partially, substantiated empirically. All of these tests were developed at ETS in order to facilitate their use by researchers. For the noncognitive area, we are at roughly the same stage that the cognitive area was in 20 years ago. We are proposing a first Guide to noncognitive factors with the bulk of the reference material emanating from many researchers and only the beginning of reference scales, in line with the existing literature, developed at ETS.

Summary lists of the 23 cognitive factors with the recommended marker tests, and the 28 temperament factors with the scales proposed for them are given in the Appendix.

Project Staff

Principal Investigator

Harry H. Harman

Associate Investigators

Diran Dermen
Ruth B. Ekstrom

Project Collaborator

John W. French
Sarasota, Florida

Other professionals

John B. Carroll (1973-74)
University of North Carolina at Chapel Hill
David B. Kirk (1972-73)
University City Science Center, Philadelphia

Research Assistant

Doris T. Conway

Programmer

Barbara Connor

Appendix I

MARKER TESTS FOR 23 COGNITIVE FACTORS

CF Closure, Flexibility of

1. Hidden Figures Test
2. Hidden Patterns Test
3. Copying Test

CS Closure, Speed of

1. Gestalt Completion Test
2. Concealed Words Test
3. Snowy Pictures

CV Closure, Verbal

1. Scrambled Words
2. Hidden Words
3. Incomplete Words

FA Fluency, Associational

1. Controlled Associations Test
2. Opposites Test
3. Figures of Speech

FE Fluency, Expressional

1. Making Sentences
2. Arranging Words
3. Rewriting

FF Fluency, Figural

1. Ornamentation Test
2. Elaboration Test
3. Symbols Test

FI Fluency, Ideational

1. Topics Test
2. Theme Test
3. Thing Categories Test

FW Fluency, Word

1. Word Endings Test
2. Word Beginnings Test
3. Word Beginnings and Endings Test

I Induction

1. Letter Sets Test
2. Locations Test
3. Figure Classification

IP Integrative Processes

1. Calendar Test
2. Following Directions
3. Language Rules

MA Memory, Associative

1. Picture-Number Test
2. Object-Number Test
3. First & Last Names Test

MS Memory Span

1. Auditory Number Span Test
2. Visual Number Span Test
3. Auditory Letter Span Test

MV Memory, Visual

1. Shape Memory Test
2. Building Memory
3. Map Memory

N Number

1. Addition Test
2. Division Test
3. Subtraction & Multiplication Test
4. Addition & Subtraction Correction

P Perceptual Speed

1. Finding A's Test
2. Number Comparison Test
3. Identical Pictures Test

RG Reasoning, General

1. Arithmetic Aptitude Test
2. Mathematics Aptitude Test
3. Necessary Arithmetic Operations Test

RL Reasoning, Logical

1. Nonsense Syllogisms Test
2. Diagramming Relationships
3. Inference Test
4. Deciphering Languages

S Spatial Orientation

1. Card Rotations Test
2. Cube Comparisons Test
3. Spatial Aspects

SS Spatial Scanning

1. Maze Tracing Speed Test
2. Choosing A Path
3. Map Planning Test

V Verbal Comprehension

1. Vocabulary Test I
2. Vocabulary Test II
3. Extended Range Vocabulary Test
4. Advanced Vocabulary Test I
5. Advanced Vocabulary Test II

VZ Visualization

1. Form Board Test
2. Paper Folding Test
3. Surface Development Test

XF Flexibility, Figural

1. Toothpicks Test
2. Planning Patterns
3. Storage Test

XU Flexibility of Use

1. Combining Objects
2. Substitute Uses
3. Making Groups
4. Different Uses

Appendix II

MARKER SCALES FOR 28 TEMPERAMENT FACTORS

Ac General Activity

1. Moves rapidly, quick in physical performance vs. slow
2. Busy, active in projects or nonsocial affairs vs. uninvolved, feels overburdened
3. Vigorous, healthy vs. tired, lacks energy

Ag Agreeableness

1. Cooperative, supportive, forgiving vs. irritated by people, vengeful
2. Adaptable, tends to agree, submissive vs. negativistic, domineering
3. Trustful, confides in people vs. suspicious, keeps distance
4. Friendly, likeable, outgoing vs. aloof, unpleasant, withdrawn

Al Alertness

1. Alertness to immediate surroundings, attentive vs. unaware, engrossed, deep in thought, absentminded

Au Autistic Tendency

1. Daydreams or has practical thoughts
2. Bothered by daydreams or autistic thinking vs. enjoys those things

Ca Calmness vs. Anxiety

1. Relaxed, stable, at ease vs. anxious, worried (about self), edgy, uneasy
2. Relaxed, adjusted, realistic thoughts vs. anxiety and worry that leads to autistic thinking
3. Physically relaxed vs. fidgets, has nervous habits, twitches, makes restless movements

Co Concentration

1. Concentration on study or reading, restraint leading to maintenance of attention vs. mind wanders, bored, forgets names

De Dependability

1. Conscientious, scrupulous vs. careless about doing what is right
2. Dependable, punctual, keeps promises vs. careless about promises and details
3. Self-sentiment control, control of own feelings vs. actions and thoughts are swayed by emotions

Do Dominance

1. Takes charge socially, wants power vs. submissive, willing to serve
2. Egoistic, pushes own ideas vs. respects others' ideas, self-effacing
3. Rights-conscious, complaining vs. tolerant

Em Emotional Maturity

1. Patient, adjusts to frustration vs. verbally aggressive, demanding
2. Modest, shuns attention, outwardly directed vs. self-centered, seeks attention, egoistical
3. Satisfied, cooperates with authority vs. asserts independence from authority, stubborn
4. Tolerant of physical, nonhuman, or situational annoyances vs. irritated by mishaps and frustrating circumstances
5. Tolerates the imperfections in things vs. feels hostility toward things that fail to work

Es Emotional Stability

1. Emotionally stable, tolerant, stolid vs. emotionally sensitive, irritable
2. Optimistic, faces problems vs. worrying, dwells on problems, escapist
3. Feels healthy vs. hypochondriacal

Gs Gregariousness

1. Likes to be alone
2. Likes working or socializing with people vs. likes work alone or isolated

In Individualism

1. Desires to be different, individualistic, free vs. needs approval of others, conforms, accepts the social order, agrees with group, likes affiliation, complies
2. Has unusual ideas, unconventional, idealistic, reflective vs. has majority opinions, tends to have same feelings as others

Me Meticulousness

1. Meticulous, orderly, neat, careful, particular about personal effects
2. Not messy, careless, or impulsive
3. Conscientious, careful, exacting, tidy, orderly

Mo Morality

1. Law-abiding, obedient, well-mannered, patriotic vs. free, progressive, liberal
2. Moral, knows right from wrong, resists temptation vs. pleasure seeking
3. Helpful, fair to people

Na Need for Achievement

1. Likes success in competition, likes getting ahead vs. dislikes competition
2. Strives for accomplishment, wants to produce something great

Ob Objectivity vs. Paranoid Tendency

1. Objectivity and fairness attributed to others vs. paranoid delusions
2. Credit is given by others vs. blame by others is unfair

Om Open-mindedness vs. Dogmatism

1. Believes many different philosophies (religious or political views) can be reasonable vs. rigid belief in one philosophy, no tolerance of compromise
2. Respect for and interest in the religious and political philosophies of other people vs. strong belief in the rightness or wrongness of principles
3. Innovative, ready for new ideas, flexible, foresighted vs. highly conservative, conventional, and unchangeable in ideas

Pe Persistence

1. Persistent, persevering, determined vs. quitting, fickle, needs change, gets discouraged
2. (The reverse of) play before work

Po Poise vs. Self-Consciousness

1. Enjoys group attention, exhibitionistic, poised vs. dislikes being in front of people
2. Enjoys performing in public, feels pride in speaking to a group vs. dislikes performing in public
3. Withdrawn, fears public speaking and social responsibilities

Rt Restraint vs. Rhathymia

1. Planning vs. acting without thought, impulsive
2. Serious, responsible vs. likely, carefree, irresponsible, no thought of the future
3. Enjoys stable pursuits vs. wants excitement, change, wildness

Sc Self-Confidence

1. Feels confident physically, personally, and career-wise vs. needs encouragement, feels inferior, afraid of failure
2. Claims to have abilities, skills, and good experiences vs. claims handicaps, ineptitude, and unfavorable experiences
3. Perceives others as having been positive toward him vs. negative

Se Sensitive Attitude

1. Warm, soft, cooperative, kind, considerate vs. hard, stern, bossy
2. Emotionally sensitive, empathetic, delicate, quiet
3. Interest in people's welfare, religion
4. Interested in people's welfare, helpful
5. Selfish, uncharitable
6. Motivation to do good or to help people

So Sociability

1. Glib talker, has superficial social know-how vs. aloof, doesn't know or care what should be said
2. Hardened socially, confident in social contacts vs. shy, socially insecure
3. Competent socially, social organizer, enjoys attention vs. withdrawn, fears public speaking and social responsibilities

Ss Self-Sufficiency

1. Self-sufficient, likes to be alone in stress, in planning, in facing problems, makes own plans, dislikes being served, self reliant, decisive vs. dependent, needs help from others, group dependent
2. Emotional independence vs. needs love, friends, succorance, and protection

Su Surgency

1. Exuberant, enthusiastic, cheerful vs. repressed, reserved, inhibited
2. Talks without inhibition, expressive, frank

Th Thoughtfulness

1. Likes to think, reflect, meditate vs. prevented from doing it by social or business activity
2. Likes to think about people or with people vs. enjoys the company of people without analyzing them
3. Thinks about self vs. carefree about self
4. Intellectual interests vs. active interests

To Tolerance of Human Nature vs. Cynicism

1. Naive, impunitive, believes people are honest and fair vs. believes people lie and are untair to gain an advantage
2. Believes people are capable of good work vs. critical, fault finding
3. Tolerant of human nature vs. cynical about human nature

Wb Well-being vs. Depression

1. Has feeling of well-being, euphoria vs. depressed, blue, lonely
2. Hopeful, interested in life vs. fear and worry about doom or vague dangers
3. Confident, can stand criticism vs. guilt prone, feels worthless and spurned, worries about self

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